COMPTON MODEL 36 SURFACE AUGER SURVEY

Date: November 5, 1975

Location: Chelyan, WV

Sponsor: Cedar Coal Co.

H&S District: 4

Personnel: MESA - J. W. Antel, J. A. Voelker, S. Szuch and M. Bryant

Company - D. Curry and C. McClung

ABSTRACT

On November 5, 1975, a survey was conducted on a Compton Model 36 surface auger to determine the effectiveness of acoustical material which had been applied to the interior of a pre-existing cab. The results of the survey showed a reduction of 3.9 dBA, from 98.0 to 94.1 dBA.

INTRODUCTION

On November 5 , 1975, a noise survey was conducted on a Compton Model 36 surface auger at the Cedar Coal Company located in Chelyan, WV. This was the second survey conducted on this machine, the first having been conducted on October 25, 1974. The purpose of this second survey was to evaluate the effectiveness of an acoustical material which had been applied to the interior of the cab mounted on the auger.

A comparison of the noise levels inside the cab before treatment (October 1974 survey) and following treatment (November 1975 survey) is contained in this report.

PROCEDURE

The tests were conducted during normal pit operations, which, in addition to the auger operating, included loading and tramming of a front-end loader and the moving of trucks in and out of the pit area.

Data collection was made through the use of a General Radio Model 1565-A sound level meter and Nagra Model IV-B tape recorder. All measurements were made as near the different operator's ears as possible.

Final analysis of the data was made with a General Radio Real Time Analyzer and a B&K spectrometer/recorder system.

RESULTS

Table I shows a comparison of noise levels in the operator's cab before and after the addition of acoustical material to the inside of the cab. The measurements were made at the operator's ear level with windows and door first opened and then closed.

Since the purpose of this survey was to determine the effectiveness of the acoustical material in the cab, only the data taken with the windows and doors closed will be discussed at this time. However, it should be noted that a significant increase does occur in noise level when the windows and door are open during operation. This difference is shown in Table II.

Figure 1 shows a graphical analysis by octave band of the noise inside the cab, door and windows closed while sumping into the coal seam.

One can immediately see the effectiveness of the acoustical material in reducing the noise throughout the sound spectrum with one exception which is the 31.5 Hz frequency band. This low frequency noise could be the result of a number of phenomena which will be discussed later in this report. Although the 3.9 dB reduction achieved with the acoustical material is quite acceptable, it is felt that this reduction could be further increased provided improvements are made in certain areas of the cab. These recommendations are outlined at the close of this report.

A second part of the survey consisted of measuring the noise levels inside the cabs of a Michigan 475 front-end loader and a Euclid 50-ton coal truck. Neither cab had been acoustically treated.

The recordings of the front-end loader were made while tramming and scooping coal with the doors opened and repeated with the doors closed.

The recordings of the Euclid coal truck were made with the windows closed while moving forward and in reverse.

The results of the analysis of this data are shown in Table III. Notice that for the front-end loader the readings are in excess of 90 dBA which could result in over exposure of the operator depending on the actual operating time involved. Figure 2 indicates that the major portion of the sound energy is in the lower frequency range. This indicates probable structural-borne noise from the power train unit and engine.

An analysis of the recording made inside the cab of the truck does not indicate a serious problem at this time. As can be seen from Table III, the readings are below 90 dBA. However, a more thorough survey would be needed in order to fully evaluate the noise levels under all conditions and in all operating modes.

CONCLUSIONS

1. The addition of acoustical material to the interior of the cab on the Compton auger significantly reduced the noise level from 98.0 to 94.1 dBA when operating with the door and windows closed.

2. Further reduction could be achieved if certain improvements were made in the construction and installation of some noise reducing components.

3. The noise levels inside the cab of the Michigan 475 front-end loader are in excess of 90 dBA both with and without the doors opened and conceivably could result in an over exposure to the operator.

4. The noise levels inside the cab of the Euclid 50-ton coal truck were shown to be below the 90 dBA level. However, further testing would be needed to ascertain the noise levels under all working conditions.

RECOMMENDATIONS

1. The windshield in the cab of the auger should be replaced with double pane glass or plexiglas with a 1-inch air space between the panes.

2. The windows could be replaced with heavier tight sealing acoustic windows or, if possible, totally eliminated and acoustical louvres installed for ventilation.

3. A rubber weather stripping should be applied around the edge of the door providing a tight seal when closed.

4. All windows should be set in rubber insulated moldings to prevent vibration.

5. Similar enclosures, either full or partial, should be provided for the crane operator and the pin puller.

6. The interior of the cab on the Michigan front-end loader should be acoustically treated with an absorptive/barrier material to prevent the exterior noises from entering the cab.

7. Silencers should be placed on the exhausts of the front-end loader.

8. The doors of the front-end loader should be kept closed when operating.

If there are any questions concerning these recommendations, contact the Noise Group, Pittsburgh Technical Support Center, Mining Enforcement and Safety Administration at (412) 621-4500, ext. 620.

TABLE I

Compton Model 36 (windows closed)

Before Treatment (Survey 10/25/74)	After Treatment (Survey 11/4/75)
Augering In - 98.0 dBA	Augering In - 94.1 dBA, 3.9 dBA reduction
Retrieving - 97.6 dBA	Retrieving - 87.6 dBA 10.0 dBA reduction

TABLE II

Compton Model 36 (treated cab)

Windows Open	Windows Closed
Augering In - 98.9 dBA	Augering In - 94.1 dBA, 4.8 dBA reduction
Retrieving - 93.3 dBA	Retrieving - 87.6 dBA, 5.7 dBA reduction

TABLE III

Operator's Position, Michigan 475 front-end loader, untreated (survey 11/4/75)

Condition	dBA	Reduction
Doors Open	95.9	-
Doors Closed	93.4	2.5

Operator's Position, Windows Closed, Euclid R-50 coal hauler, untreated (survey 11/4/75)

Condition	dBA
Forward	89.3
Reverse	84.2
Being Loaded (noise from loader)	81.7
Coal Hitting Bed of Hauler	86.8

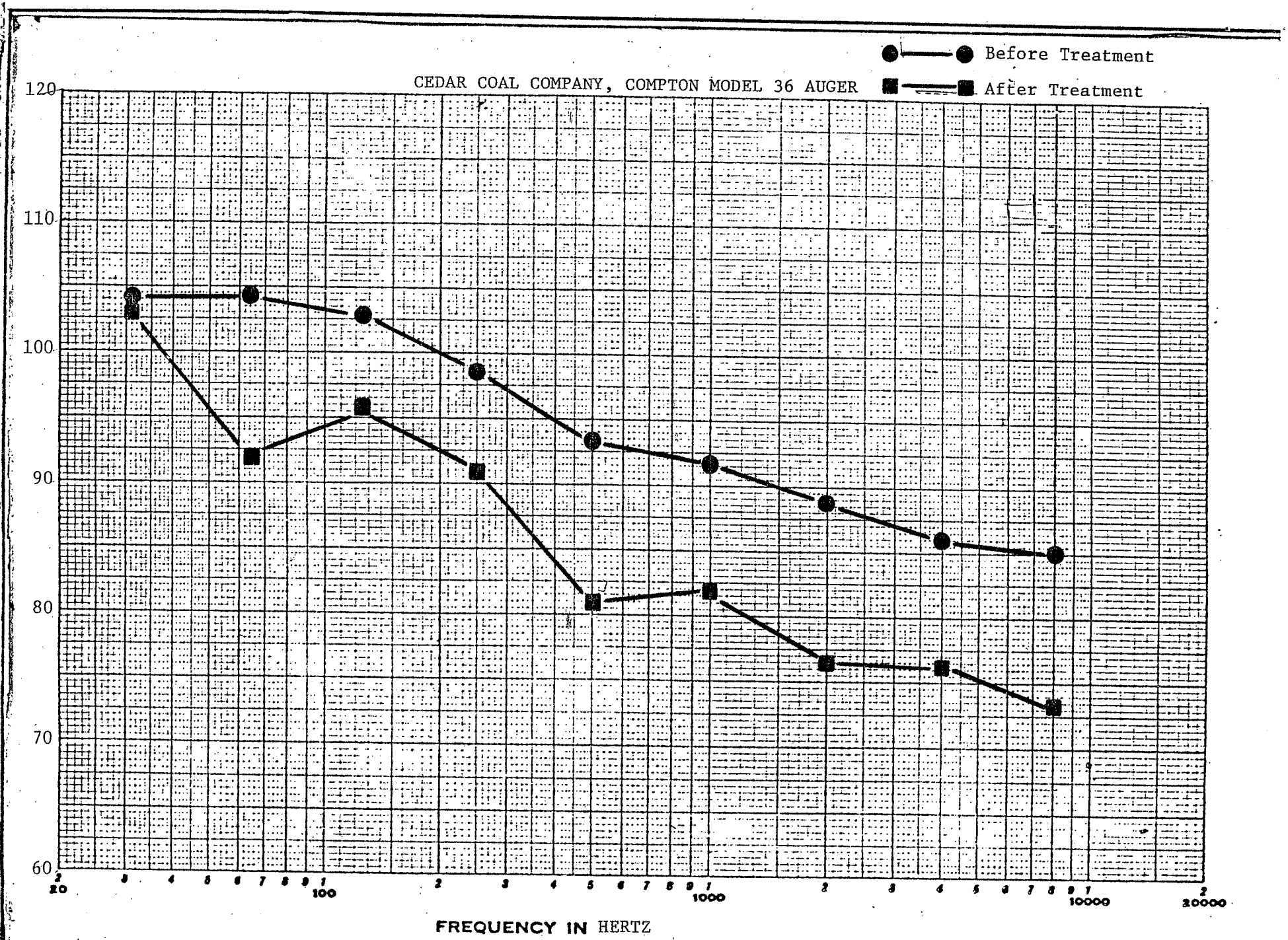

FIGURE 1 - Operator's Position - Augering in, door and windows closed. Before treatment - 98.0 dBA; After treatment - 94.1 dBA

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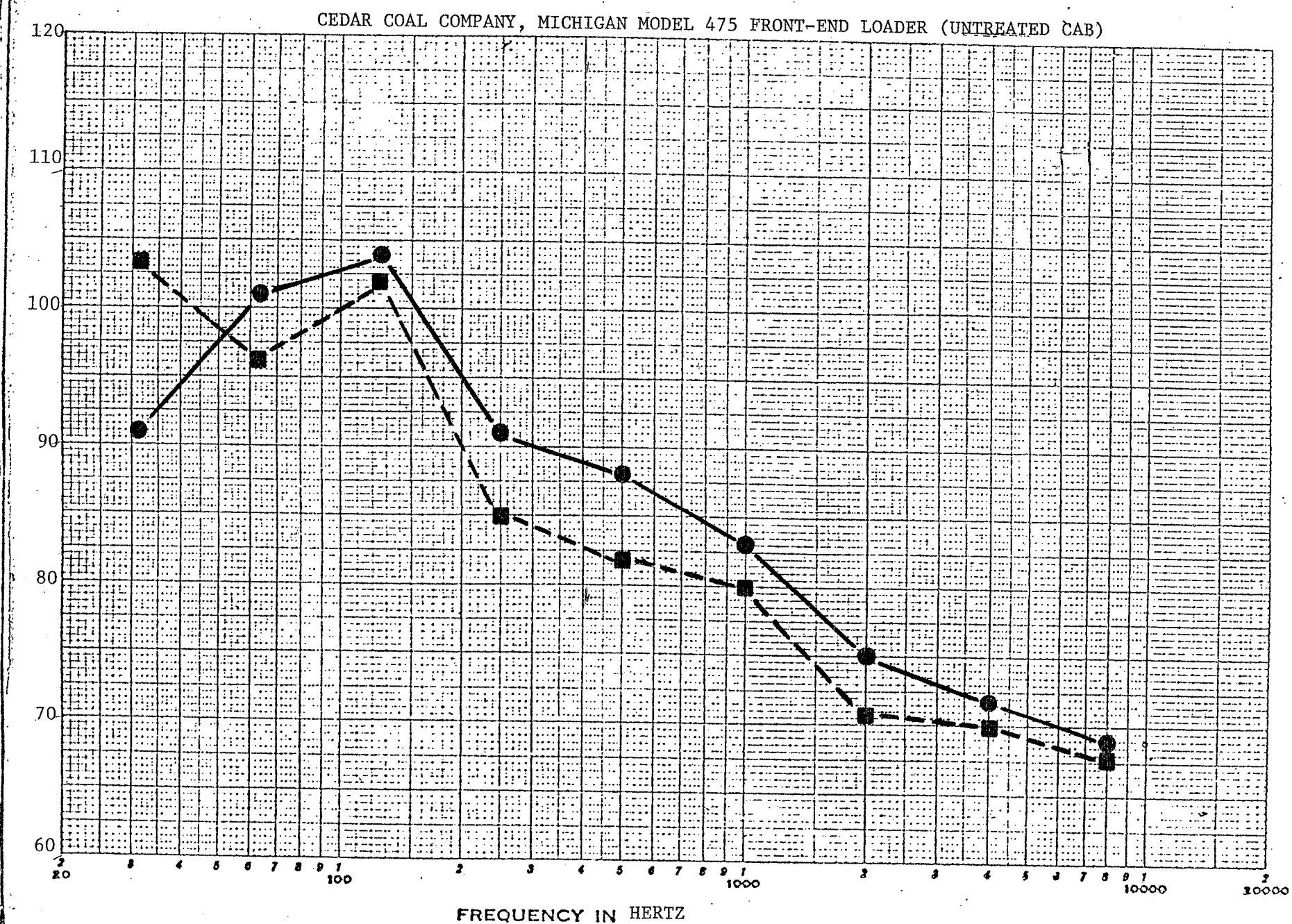

FIGURE 2 - Operator's Position

●——● Doors Open, 95.9 dBA, 110.8 dBC

■---■ Doors Closed, 93.4 dBA, 109.8 dBC

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